AEC-NASA TECH BRIEF

Automatic Filter-Blowback Systems Used with Sintered-Metal Filters

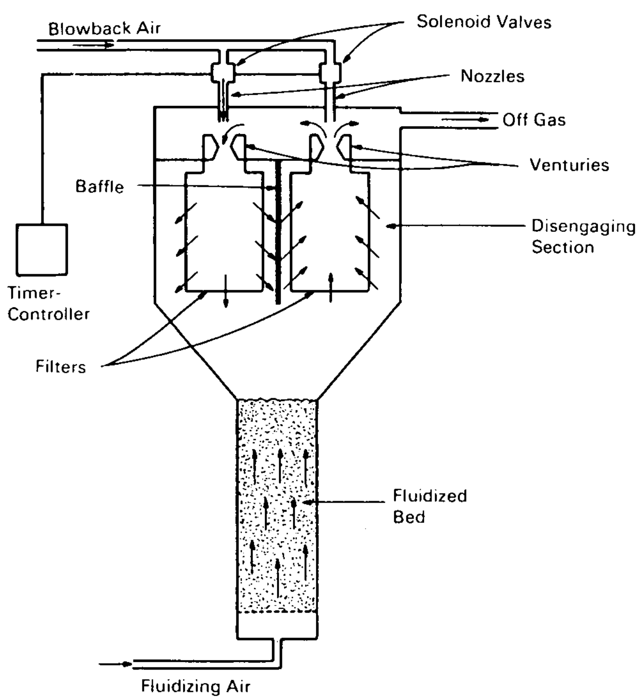

Fig. 1. Schematic Diagram of Automatic Filter-blowback System

Experimental testing and operational experience with automatic filter-blowback systems, used with sintered-metal filters, have been summarized *(1)*. Performance data and the effects of variables were investigated with several systems.

Sintered-metal filters have been used, in a wide variety of pilot-plant and laboratory fluid-bed reactors, to remove entrained particulate solids from the fluid-bed effluent-gas stream; removal prevents loss of material from the reactor or contamination of the gas stream. The particulate solids generally accumulate on these filters as a layer that requires periodic removal for two basic reasons: as the loading of solids on the filter increases, the pressure drop across the filter increases, with lowering of the throughput rate of the gas; and periodic removal of accumulated solids is needed for return of incompletely reacted material to the fluid bed so that reaction with the gases can be completed.

In the filter-blowback system investigated, the filters are cleaned by impulse from a high-velocity, short-duration, reverse-flow air pulse; solenoid-ac-

(continued overleaf)

tuated air nozzles are directed into venturi fittings surmounting each filter. The solenoids are actuated cyclically by an electric timer. Fractional-second bursts of air at 100-lb/inch^2 give excellent cleaning of the filters; pressures as low as 15 lb/inch^2 (absolute) have been successful. Because of the venturi and the high-velocity air flow from the nozzle, some of the filtered off-gas is syphoned back to aid in cleaning. The advantages of this system are that the blowback air required is reduced from that required in a constant-flow scheme, the filters are cleaned more effectively, the filters are on-stream for a larger percentage of time, and operation is completely automatic.

Another major advantage of pulse blowback is that it reduces the filter-plugging that occurred in continuous reverse-flow blowback systems. With continuous flow, portions of the filter appear to be cleaned too thoroughly; with pulse blowback, a dust layer remains that, acting as a prefilter, does the filtering in place of the sintered metal.

From the available data, two parameters were calculated for reduction of variables in blowback design to more-fundamental forms. For the operating units examined, the ratio of the blowback gas rate to the normal forward-flow filtering gas rate ranged from 1.3 to 10.0; with testing from other sources, the optimum ratio ranged from 0.5 to 2.0. The second parameter compared was the ratio of the volume of a blowback pulse to the volume of the internal filter; it ranged from 0.5 to 8.0 for the various units.

The report also contains miscellaneous information on calculated concentrations of fines in a fluidized bed as a function of blowback interval and elutriation rate, pore-size testing of sintered-metal filters, and tests of the filtration efficiency of sintered-metal filters.

Reference:

1. E. L. Carls and N. M. Levitz, *ANL-7392* (Argonne National Laboratory, Jan. 1968); available from CFSTI, Springfield, Va. 22151, at $3.00 (microfiche, $0.65).

Notes:

1. This information may interest the hydraulics and pneumatics industries, filter and catalyst manufacturers, and air-pollution controllers.
2. Inquiries may be directed to:

   Office of Industrial Cooperation
   Argonne National Laboratory
   9700 South Cass Avenue
   Argonne, Illinois 60439
   Reference: B69-10342

Source: E. L. Carls and N. M. Levitz
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Patent status:

Inquiries concerning rights for commercial use of this innovation may be made to:

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